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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/961,165	09/21/2001	Luis Trejo	TI-21129	4601

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EXAMINER

NGUYEN, DONGHAI D

ART UNIT	PAPER NUMBER
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3729

DATE MAILED: 09/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/961,165

Applicant(s)

TREJO, LUIS

Examiner

Donghai D. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The proposed reply filed on 08/05/2003 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrases “the desired ball” (claim 1, line 17), “said computerized bonder” (claim 11, line 3), “the end of a wire” (claims 12 and 16, line 1), “the preceding pulse” (claim 12, line 4), and “the last pulse” (claims 14 and 15, line 1) lack antecedent basis.

The phrase “said plurality” (claim 12, line 4 and also in claim 14 and 15) is vague and indefinite. It is unclear as to the plurality of what is referred to.

Furthermore, independent claims 12 and 14 are incomplete since there is no product, i.e. a ball, at the end of a wire found as a result of performing the recited method step(s). Moreover it is unclear how the ball is formed by merely exposing the end of wire to the current pulses.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3 and 7-12 are rejected under 35 U.S.C. 102(b) as being anticipated by US

Patent 4,390,771 to Kurtz et al

Regarding claim 1, Kurtz et al disclose a method for forming a substantially spherical free air ball on a fine non-oxidizable wire, comprising the steps of: positioning a free end of said wire (11) opposite to an EFO electrode (28), spaced apart by a gap (Figs. 4A, 4B and 5); applying a train of EFO current pulses between said electrode and said wire (col. 6, lines 63-67); controlling said pulse heights to melt a pre-determined volume of said wire (col. 3, lines 41-47); controlling said pulse widths to create a substantially spherical ball shape (col. 3, lines 41-47); and automatically calculating the train of consecutive EFO current pulses of various heights and widths (first and second pulse train in Col. 3, lines 55-62; Fig. 8), to produce a desired ball characteristics in a predetermined amount of time (Abstract, line 5-14, since the pulse train and energy is control and measured therefor they are calculated to form a desired ball bonding).

Regard claim 2, Kurtz et al. disclose the train of pulses comprises only two or three pulses (first and second pulse train in Col. 3, lines 55-62; Fig. 8).

Regarding claim 3, Kurtz et al disclose the wire is selected from a group consisting of gold, copper, silver, alloys thereof, plated materials, and insulated metal wires (col. 5, line 19).

Regarding claims 7 and 8, Kurtz et al disclose the train of EFO current pulses provides a continuous series of pulses of progressively lower heights, yet various pulse widths for minimizing the heat affected zone of the wire (col. 3, lines 41-47; Fig. 8).

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Regard to claims 9 and 10, Kurtz et al show the train of EFO current pulses provides a series of pulses alternating between high and low heights and various widths and the low pulse height is configured to prevent overheating of the free air ball and wire necking while maintaining the EFO arc (col. 10, line 36-48; Fig. 8).

Regarding claim 11, an automatic pulse train calculation is provided by pre-determined empirical data stored in a computerized bonder (40, inherence).

Regarding claim 12, Kurtz et al disclose a method of forming a ball at an end of wire (11), comprising the step of: exposing the end of the wire to a plurality of current pulses (TP, H.V.), wherein each pulse in the plurality has a lower magnitude the preceding pulse (Fig. 8).

6. Claims 1-6 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 4,523,071 to Bancroft et al.

Regarding claim 1, Bancroft et al disclose a method for forming a substantially spherical free air ball (15) on a fine non-oxidizable wire, comprising the steps of: positioning a free end of the wire (13) opposite to an EFO electrode (22), spaced apart by a gap (G, Fig. 1); applying a train of EFO current pulses (29 and 59) between said electrode and said wire; controlling said pulse heights to melt a pre-determined volume of said wire (col. 4, line 63 to col. 5, line 7); controlling said pulse widths to create a substantially spherical ball shape (col. 5, lines 4-7); and automatically calculating the train of consecutive EFO current pulses of various heights and widths, to produce a desired ball characteristics in a predetermined amount of time (inherence, the pulses are calculated by the tune circuit 31, control pulse source 23 and control pulse 25 for forming a desired ball; Col. 4, line 39 to col. 5, line 7).

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In claim 2, Bancroft et al disclose the train of pulses comprises 2 or 3 pulses (Fig. 2).

Regarding claims 3 and 4 Bancroft et al disclose the wire is copper (col. 3, line 3) and having diameter about 25-75 μm (Col. 4, line 36).

Regarding claim 5, Bancroft et al disclose the wire melting and ball forming is performed in ambient air (col. 8, line 14).

Regarding claim 6, Bancroft et al disclose the train of EFO current pulses is further controlled to reduce size and damage in the heat-affected zone, thereby providing smooth wire loop formation (col. 4, line 59 to col. 5, line 1).

Regarding claim 16, Bancroft et al disclose a method of forming a ball (15) at the end of wire (13), comprising the step of: exposing the end of the wire to a first current pulse (A); exposing the end of the wire to a second current pulse (E), wherein the second pulse is lesser magnitude than the first pulse; and exposing the end of the wire to a third current pulse (C), wherein the third pulse is of a magnitude between the magnitude of the first and second pulses (Fig. 2).

7. Claims 12-16 and 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent Re. 33,330 to Ogasawara et al.

Regarding claim 12, Ogasawara et al disclose a method of forming a ball (2) at an end of wire (1), comprising the step of: exposing the end of the wire to a plurality of current pulses, wherein each pulse in the plurality has a lower magnitude the preceding pulse (Figs. 3 and 8).

Regarding claim 13, Ogasawara et al. disclose the plurality of current pulses comprises three pulses, wherein the first (I_{AP}) of the three pulse is of a first duration (d-e), the second (I_{SP})

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of the three pulses is of a second duration (b-c), the second duration being shorter than the first duration, and the third duration (I_{AB}) of the three pulses is of a third duration (e-g), the third duration being longer than the first and second duration (Fig. 3).

Regarding claims 14 and 15, Fig. 3 shows the last pulse (I_{AB}) in the plurality is of a magnitude that is about half the magnitude of the first pulse in the plurality (I_{AP} and I_{SP}) and the duration of the last pulse (I_{AB}) in the plurality is over twice as long as the duration of the first (I_{AP}) pulse in the plurality.

Regarding claim 16, Ogasawara et al disclose a method of forming a ball (2) at the end of wire (1), comprising the step of: exposing the end of the wire to a first current pulse (I_{SP}); exposing the end of the wire to a second current pulse (I_{AB}), wherein the second pulse is lesser magnitude than the first pulse; and exposing the end of the wire to a third current pulse (I_{AP}), wherein the third pulse is of a magnitude between the magnitude of the first and second pulses (Fig. 3).

Regarding claims 18 and 19, Fig. 3 shows the magnitude of third current pulse is about half the magnitude of the first current pulse and the duration (d-e) of the third current pulse in the plurality is over twice as long as the duration (b-c) of the first pulse in the plurality.

Allowable Subject Matter

8. Claim 17 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

9. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghai D. Nguyen whose telephone number is (703) 305-7859. The examiner can normally be reached on Monday-Friday (9:00-6:00).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter D. Vo can be reached on (703) 308-1789. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1148.

DN

September 16, 2003

A handwritten signature in black ink, appearing to read 'Peter Vo', is written over a horizontal line.

PETER VO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700